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EXAMINER	
LEE, GINA W	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)
	10/708,576	HSU, CHIEN-HUA
	Examiner	**Art Unit**
	GINA W. LEE	2626

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 06 December 2007.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-22 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-22 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 12 March 2004 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. In response to the office action from 9/21/2007, Applicant has submitted an amendment, filed 12/6/2007, amending claims 7 and 13, and arguing to traverse art rejections based on the applicability of the prior art of Hilpert. The Applicant's arguments have been fully considered, but they are moot in view of the new grounds of rejection and do not place the claims in condition for allowance.

2. The previous objections directed to Applicant's claims have been withdrawn by the examiner, in view of the amendment.

Change of Art Units

3. Please note that the examiner has changed art units, which was formerly 2609. The examiner's new art unit is 2626.

Response to Arguments

4. Applicant's arguments with respect to claims 1-16 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

5. Claim 2 is objected to because of the following informalities: "execute" should be "executes".

Appropriate correction is required.

Claim Rejections - 35 USC § 103

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

7. Claims 1 and 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smyth (US 5,956,674) in view of the Applicant's Admitted Prior Art.

8. With respect to independent **claim 1**, Smyth teaches a method for coding an input signal to an output signal, the method comprising:

- performing a subband coding process to produce a plurality of subband samples according to the input signal, different subband samples corresponding to the input signal in different time intervals, each of the subband samples having a plurality of frequency subbands (*Fig. 5, col. 9, lines 28-40 and col. 10, lines 56-59, frame grabber (64) selects the frame size for and windows the sampled PCM audio signal (14); polyphase filter bank (34) splits each data frame (66) into subbands, each subband covers a range of frequencies; samples output from each subband are buffered and applied to the 32-band coding stage (36))*;
- performing a selection process to provide a window corresponding to a predetermined block length, the window including a plurality of weighted values, the selection process including selecting subband samples from the

plurality of subband samples as reference sample data, [and determining the block length of the window] according to an energy sum of the frequency subbands of the reference sample data in a predetermined frequency range *(col. 17, line 1-col. 19, line 44, controller (106) calculates prediction mode based on the prediction gain (ratio of the input signal energy and the estimated difference signal energy) and the transient mode for each subframe in each subband (indicate the number of scale factors and samples). The analysis buffer is partitioned into sub-subframes and in the case of a transient, pre-transient sub-subframes and post-transient sub-subframes are encoded differently (with different scale factors). In the case of no transient, only a single scale factor is calculated using all the data in the analysis buffer.)*; and

- performing a transform process to multiply the plurality of frequency subbands by the plurality of weighted values of the window determined in the selection process for producing a weighted result, and to generate the output signal by a predetermined algorithm according to the weighted result *(Fig.3, col. 7, lines 50-51, coding stage (36) codes each subband signal and multiplexes them into the output data stream; Fig. 10, col. 11, line 47-col. 12, line 4, coder (72) generates predictor coefficients, differential quantizer bit allocations and quantizer scale factors for the buffered subband samples)*

but Smyth does not teach the technique of window switching (in the second step). However, the examiner contends that these concepts were well known in the art, as taught by the applicant's admitted prior art.

In the same field of endeavor, the applicant's admitted prior art teaches that window switching is a typical technique used in frequency domain coding that depends on the accurate detection of the transient *(Fig. 1, paragraphs [0009] and [0010])*.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add modify the method of Smyth with the window switching technique of the applicant's admitted prior art, to achieve the predictable result of avoiding the pre-echo effect by using shorter windows when the amplitude of a signal changes rapidly.

9. With respect to **claim 6**, Smyth in view of the applicant's admitted prior art teaches everything claimed, as applied above (see claim 1); in addition, Smyth also teaches `the method of claim 1 wherein the input signal is a pulse code modulation (PCM) signal` *(Fig. 5, col. 9, lines 28-30, PCM audio data is the input signal)*.

10. With respect to **claim 7**, Smyth in view of the applicant's admitted prior art teaches everything claimed, as applied above (see claim 1); in addition, Smyth also teaches `the method of claim 1 wherein the output signal is a bit stream` *(Fig. 5, col. 9, line 56, output signal is a data stream (16) which can be transmitted)*.

11. With respect to **claim 8**, Smyth in view of the applicant's admitted prior art teaches everything claimed, as applied above (see claim 1). The method of Smyth uses the Fourier transform, and does not teach the use of the MDCT. However, the applicant's admitted prior art

teaches the method of claim 1 wherein the predetermined algorithm is a modified discrete cosine transform (MDCT) *(paragraph [0009])*.

Both Smyth and the applicant's admitted prior art teach methods comprising performing a time-to-frequency transform in the context of an audio coding method (the Fourier transform and the modified discrete cosine transform). Each algorithm is one of a finite number of known algorithms for the time-to-frequency transform. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to try the transform of the applicant's admitted prior art with the coding method of Smyth in an attempt to improve the method, as a person with ordinary skill has good reason to pursue the known options within his or her technical grasp.

12. Claims 2, 5, 9, 10, and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smyth (US 5,956,674) in view of the Applicant's Admitted Prior Art and further in view of Hilpert (US 6,453,282).

13. With respect to **claim 2**, Smyth in view of the applicant's admitted prior art teaches everything claimed, as applied above (see claim 1); in addition, Smyth teaches the method of claim 1 wherein in the selection process, further execute a first comparing process comprising:

- dividing the reference sample data into several subsample data, each subsample data having at least a subband sample *(col. 18, line 52- col. 19, line 61, buffer is divided into multiple sub-subframes to achieve a particular time resolution)*; and

- calculating an energy difference of the frequency subbands between two adjacent subsample data in the predetermined frequency range, if the energy difference is larger than a second threshold value *(col. 19, lines 19-33, a sub-subframe is declared transient if the ratio of its energy over the preceding sub-buffer exceeds a transient threshold)*

but Smyth in view of the applicant's admitted prior art does not teach that the comparing process is performed if the energy sum of the frequency subbands of the reference sample data in the predetermined frequency range is larger than a first threshold value, or the technique of window switching (using a window of a short block length in the transform process). However, the examiner contends that these concepts were well known in the art, as taught by Hilpert and the applicant's admitted prior art.

In a related field of endeavor, Hilpert teaches a method of transient detection in which the energy of the signal must exceed a minimum energy *(col. 8, lines 41-50)*. In the same field of endeavor, the applicant's admitted prior art teaches the technique of window switching *(paragraphs [0009] and [0010], see also rejection of claim 1)*.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Smyth in view of the applicant's admitted prior art by adding Hilpert’s condition that the energy must exceed a certain level, in order to conserve resources for when the signal has a significant amount of data and is more likely to contain a transient, and to further modify it with the technique of window switching of the applicant's

admitted prior art, to achieve the predictable result of avoiding the pre-echo effect by using shorter windows when the amplitude of a signal changes rapidly.

14. With respect to **claim 5**, Smyth in view of the applicant's admitted prior art and further in view of Hilpert teaches everything claimed, as applied above (see claim 2); in addition, Smyth in view of Hilpert and the applicant's admitted prior art teaches that `if the energy sum of the frequency subbands of the reference sample data in the predetermined frequency range is less than the first threshold value` *(Hilpert, col. 8, lines 41-50, energy of the signal must exceed a minimum energy to trigger a change to the short window)*, `then transform with a window of a long block length in the transform process` *(Applicant's admitted prior art, paragraph [0009], long windows are used if transients do not occur)*.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Smyth in view of the applicant's admitted prior art and Hilpert by adding Hilpert's condition that the energy must exceed a certain level, in order to conserve resources for when the signal is more likely to contain a transient, and to further modify it with the technique of window switching of the applicant's admitted prior art, to achieve the predictable result of providing better frequency resolution and greater compression whenever possible by using longer windows when the amplitude of a signal is not changing rapidly.

15. With respect to independent **claim 9**, Smyth teaches a `coding apparatus for coding an input signal to an output signal` *(Fig. 5, abstract)*, `the coding apparatus comprising:`

- a polyphase filter bank for producing a plurality of subband samples according to the input signal, different subband samples corresponding to the input signal in different time intervals, each subband sample having a plurality of frequency subbands *(Fig.3, col. 7, lines 45-49 and col. 10, lines 56-60, data frames (66) are split into subbands (68) using polyphase filterbank (34))*;
- a transient detector connected to the polyphase filter bank … the window including a plurality of weighted values *(Fig. 13, col. 17, line 1-col. 19, line 44, controller (106) calculates prediction mode based on the prediction gain (ratio of the input signal energy and the estimated difference signal energy) and the transient mode for each subframe in each subband (indicate the number of scale factors and samples))*, the transient detector including:
    - a subband selector for selecting the plurality of subband samples as reference sample data *(Fig. 13, col. 14, lines 44-48, subband sample buffers (96) store a complete frame for each subband signal)*; and
    - an energy calculator connected to the subband selector for calculating an energy sum of the frequency subbands of the reference sample data *(col. 17, line 1-col. 19, line 44, controller (106) obtains the input signal energy for a frame or subframe)*;
    - a partition device connected to the subband selector and the energy calculator for dividing the reference sample data into several subsample data, each subsample data having at least a subband sample *(col. 18, line 52- col. 19,*

line 61, buffer is divided into multiple sub-subframes to achieve a particular time resolution);

- a coding processing unit connected to the polyphase filter bank and the transient detector for multiplying the plurality of frequency subbands by the plurality of weighted values of the window to generate a weighted result, and generating the output signal by a predetermined algorithm according to the weighted result *(Fig.3, col. 7, lines 50-51, coding stage (36) codes each subband signal and multiplexes them into the output data stream; Fig. 10, col. 11, line 47-col. 12, line 4, coder (72) generates predictor coefficients, differential quantizer bit allocations and quantizer scale factors for the buffered subband samples)*.

However, Smyth does not teach that the transient detector comprises

- a comparator connected to the energy calculator for comparing an output value of the energy calculator with a first threshold value, and outputting a signal representing the block length of the window according to a comparing result;

nor does it teach that the transient detector is used for window switching. However, the examiner contends that these concepts were well known in the art, as taught by Hilpert and the applicant's admitted prior art.

In a related field of endeavor, Hilpert teaches a transient detector in which the energy of the signal must exceed a minimum energy *(col. 8, lines 41-50, rise detector (20))*. In the same field of endeavor, the applicant's admitted prior art teaches the technique of window switching *(paragraphs [0009] and [0010], see also rejection of claim 1)*.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Smyth by adding Hilpert's comparator to confirm that the energy must exceed a certain level, in order to conserve resources for when the signal has a significant amount of data and is more likely to contain a transient, and to further modify it with the technique of window switching of the applicant's admitted prior art, to achieve the predictable result of avoiding the pre-echo effect by using shorter windows when the amplitude of a signal changes rapidly.

16. With respect to **claim 10**, Smyth in view of the applicant's admitted prior art and further in view of Hilpert teaches everything claimed, as applied above (see claim 9); in addition, Smyth teaches the coding apparatus of claim 9 wherein the energy calculator calculates an energy difference of the frequency subbands of two adjacent subsample data, and delivers a result to the comparator for comparing the result with a second threshold value *(col. 19, lines 19-33, the controller (106) determines if a sub-subframe is declared transient by calculating the ratio of its energy over the preceding sub-buffer to be compared to a transient threshold)*.

17. With respect to **claim 12**, Smyth in view of the applicant's admitted prior art and further in view of Hilpert teaches everything claimed, as applied above (see claim 9); in addition, Smyth teaches the coding apparatus of claim 9 wherein the input signal is a pulse code modulation (PCM) signal *(Fig. 5, col. 9, lines 28-30, PCM audio data is the input signal)*.

18. With respect to **claim 13**, Smyth in view of the applicant's admitted prior art and further in view of Hilpert teaches everything claimed, as applied above (see claim 9); in addition, Smyth teaches `the coding apparatus of claim 9 wherein the output signal is a bit stream` *(Fig. 5, col. 9, line 56, output signal is a data stream (16) which can be transmitted)*.

19. With respect to **claim 14**, Smyth in view of the applicant's admitted prior art and further in view of Hilpert teaches everything claimed, as applied above (see claim 9). The method of Smyth uses the Fourier transform, and does not teach the use of the MDCT. However, the applicant's admitted prior art teaches `the coding apparatus of claim 9 wherein the predetermined algorithm is a modified discrete cosine transform (MDCT).`

Both Smyth and the applicant's admitted prior art teach methods comprising performing a time-to-frequency transform in the context of an audio coding method (the Fourier transform and the modified discrete cosine transform). Each algorithm is one of a finite number of known algorithms for the time-to-frequency transform. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to try the transform of the applicant's admitted prior art with the coding method of Smyth in an attempt to improve the method, as a person with ordinary skill has good reason to pursue the known options within his or her technical grasp.

20. Claims 3, 4, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smyth (US 5,956,674) in view of the Applicant's Admitted Prior Art and Hilpert (US 6,453,282) as applied to claim 2 or claim 10 above, and further in view of Davidson (US 5,394,473).

21. With respect to **claim 3**, Smyth in view of the applicant's admitted prior art and further in view of Hilpert teaches everything claimed, as applied above (see claim 2); but while Smyth teaches the comparison of energy between subframes, Smyth in view of the applicant's admitted prior art and Hilpert does not teach `the method of claim 2 wherein the selection process further comprises:`

- `when performing the first comparing process, if the energy difference of the frequency subbands between two adjacent subsample data in the predetermined frequency range is less than or equal to the second threshold value, performing a second comparing process and let the subsample data in the second comparing process include different subband samples from the subband samples of the subsample data in the first comparing process.`

However, the examiner contends that this concept was well known in the art, as shown by Davidson.

In the same field of endeavor, Davidson teaches a method of audio coding in which the adjacent subblocks are compared, and comparison is repeated for the subframes on the next hierarchical level if a threshold is not surpassed *(Fig. 10, and 13-15; col. 23-25)*.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Smyth in view of the applicant's admitted prior art

and Hilpert with Davidson's "tree" based iterative comparison technique in order to establish the time of transient occurrence in a block with more accuracy.

22. With respect to **claim 4**, Smyth in view of applicant's admitted prior art, Hilpert, and Davidson teaches everything claimed, as applied above (see claim 3); in addition, Davidson teaches `the method of claim 3 wherein when performing the second comparing process, a different second threshold value is selected` *(col. 44, Tables III and IV, different ratios can be used for different subframe levels)*.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Smyth in view of Hilpert and the applicant's admitted prior art with Davidson's iterative comparison technique in order to establish the time of transient occurrence in a block with more accuracy, and to use different threshold ratios for the comparisons to compensate for longer or shorter segments (and longer or shorter time for changes to occur).

23. With respect to **claim 11**, Smyth in view of the applicant's admitted prior art and further in view of Hilpert teaches everything claimed, as applied above (see claim 10); but while Smyth teaches a comparator to compare the energy difference of two subsamples, Smyth in view of the applicant's admitted prior art and Hilpert does not teach `the coding apparatus of claim 10 wherein the partition device divides the reference sample data into several subsample data according to the result of the comparator, each subsample data including subband samples different from the subband samples of the preceding subsample`

data. However, the examiner contends that this concept was well known in the art, as shown by Davidson.

In the same field of endeavor, Davidson teaches an audio coder in which adjacent subblocks are compared, and comparison is repeated for the subframes on the next hierarchical level if a threshold is not surpassed *(Fig. 10, and 13-15; col. 23-25)*.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the coding apparatus of Smyth in view of Hilpert and the applicant's admitted prior art with Davidson's iterative comparison technique in order to establish the time of transient occurrence in a block with more accuracy.

24. Claims 15, 16, 19, 20, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smyth (US 5,956,674) in view of Hilpert (US 6,453,282).

25. With respect to independent **claim 15**, Smyth teaches a method for transient detection when coding an audio signal, the method comprising the following steps:

(a) producing a plurality of subband samples according to the audio signal, different subband samples corresponding to the audio signal in different time intervals, each subband sample including a plurality of frequency subbands (*Fig. 5, col. 9, lines 28-40 and col. 10, lines 56-59, frame grabber (64) selects the frame size for and windows the sampled PCM audio signal (14); polyphase filter bank (34) splits each data frame (66) into subbands, each subband*

covers a range of frequencies; samples output from each subband are buffered and applied to the 32-band coding stage (36));

(b) selecting subband samples from the plurality of subband samples as reference sample data *(Fig. 13, col. 14, lines 44-48, subband sample buffers (96) store a complete frame for each subband signal*, and calculating an energy sum of the frequency subbands in a predetermined frequency range according to the reference sample data *(col. 17, line 1-col. 19, line 44, controller (106) calculates prediction mode based on the prediction gain (ratio of the input signal energy in the analysis buffer and the estimated difference signal energy) and the transient mode for each subframe in each subband.)*;

(c) [if the energy sum of the frequency subbands in the predetermined frequency range is larger than a first threshold value,] dividing the reference sample data into several subsample data, each subsample data having at least a subband sample *(col. 18, line 52- col. 19, line 61, buffer is divided into multiple sub-subframes to achieve a particular time resolution)*; and

(d) calculating an energy difference of the frequency subbands between two adjacent subsample data in the predetermined frequency range, and according to the energy difference determining whether there is a transient of the audio signal of a time interval corresponding to the subsample data *(col. 19, lines 19-33, a sub-*

> *subframe is declared transient if the ratio of its energy over the preceding sub-buffer exceeds a transient threshold)*.

but does not teach the condition of step (c) `(if the energy sum of the frequency subbands of the reference sample data in the predetermined frequency range is larger than a first threshold value)`. However, the examiner contends that these concepts were well known in the art, as taught by Hilpert.

In a related field of endeavor, Hilpert teaches a method of transient detection in which the energy of the signal must exceed a minimum energy *(col. 8, lines 41-50)*.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Smyth by adding Hilpert's condition that the energy must exceed a certain level, in order to conserve resources for when the signal has a significant amount of data and is more likely to contain a transient.

26. With respect to **claim 16**, Smyth in view of Hilpert teaches everything claimed, as applied above (see claim 15); in addition, Smyth teaches `the method of claim 15 wherein when determining the transient of the audio signal according to the energy difference in step (d), if the energy difference is larger than a second threshold value, determining the audio signal between the two subsample data is the transient` *(col. 19, lines 19-33, a sub-subframe is declared transient if the ratio of its energy over the preceding sub-buffer exceeds a transient threshold)*.

27. With respect to independent **claim 19**, Smyth teaches a transient detector installed in a coding apparatus for detecting whether an audio signal includes a transient, the coding apparatus comprising a polyphase filter bank for producing a plurality of subband samples according to the audio signal, different subband samples corresponding to the audio signal in different time intervals, each subband sample having a plurality of frequency subbands *(Fig.3, col. 7, lines 45-49 and col. 10, lines 56-60, data frames (66) are split into subbands (68) using polyphase filterbank (34))*, the transient detector being connected to the polyphase filter bank and comprising:

- a subband selector for selecting the plurality of subband samples as a reference sample data *(Fig. 13, col. 14, lines 44-48, subband sample buffers (96) store a complete frame for each subband signal)*;
- an energy calculator connected to the subband selector for calculating an energy sum of the frequency subbands of the reference sample data *(col. 17, line 1-col. 19, line 44, controller (106) obtains the input signal energy for a frame or subframe)*; and
- a partition device connected to the subband selector and the energy calculator for dividing the reference sample data into several subsample data, each subsample data having at least a subband sample *(col. 18, line 52- col. 19, line 61, buffer is divided into multiple sub-subframes to achieve a particular time resolution)*;

but Smyth does not teach that the transient detector comprises

- `a comparator connected to the energy calculator for comparing an output value of the energy calculator with a first threshold value, and determining whether the audio signal includes a transient according to a comparing result.`

However, the examiner contends that these concepts were well known in the art, as taught by Hilpert.

In a related field of endeavor, Hilpert teaches a transient detector in which the energy of the signal must exceed a minimum energy *(col. 8, lines 41-50, rise detector (20))*.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Smyth by adding Hilpert's comparator to confirm that the energy must exceed a certain level, in order to conserve resources for when the signal has a significant amount of data and is more likely to contain a transient, and to further modify it with the technique of window switching of the applicant's admitted prior art, to achieve the predictable result of avoiding the pre-echo effect by using shorter windows when the amplitude of a signal changes rapidly.

28. With respect to **claim 20**, Smyth in view of Hilpert teaches everything claimed, as applied above (see claim 19); in addition, Smyth teaches `the transient detector of claim 19 wherein the energy calculator calculates an energy difference of the frequency subbands of two adjacent subsample data, and delivers a result to the comparator for comparing the result with a second threshold value` *(col. 19, lines 19-33, the controller (106)*

determines if a sub-subframe is declared transient by calculating the ratio of its energy over the preceding sub-buffer to be compared to a transient threshold).

29. With respect to **claim 22**, Smyth in view of Hilpert teaches everything claimed, as applied above (see claim 19); in addition, Smyth teaches the transient detector of claim 19 wherein the audio signal is a pulse code modulation (PCM) signal *(Fig. 5, col. 9, lines 28-30, PCM audio data is the input signal)*.

30. Claims 17, 18, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smyth (US 5,956,674) in view of Hilpert (US 6,453,282) as applied to claim 15 or claim 20 above, and further in view of Davidson (US 5,394,473).

31. With respect to **claim 17**, Smyth in view of Hilpert teaches everything claimed, as applied above (see claim 15); but while Smyth teaches the comparison of energy between subframes, Smyth in view of Hilpert does not teach the method of claim 15 wherein in step (d), if the energy difference of the frequency subbands between two adjacent subsample data in the predetermined range is less than the second threshold value, dividing the reference sample data into several subsample data different from the subsample data in step (c) and re-executing step (d).

However, the examiner contends that this concept of subdividing and comparing was well known in the art, as shown by Davidson.

In the same field of endeavor, Davidson teaches a method of audio coding in which the adjacent subblocks are compared, and comparison is repeated for the subframes on the next hierarchical level if a threshold is not surpassed *(Fig. 10, and 13-15; col. 23-25)*.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Smyth in view of Hilpert with Davidson's iterative comparison technique in order to establish the time of transient occurrence in a block with more accuracy.

32. With respect to **claim 18**, Smyth in view of Hilpert, and further in view of Davidson teaches everything claimed, as applied above (see claim 17); in addition, Davidson teaches `the method of claim 17 wherein when re-executing step (d), a different second threshold value is selected` *(col. 44, Tables III and IV, different ratios can be used for different subframe levels)* .

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Smyth in view of Hilpert with Davidson's iterative comparison technique in order to establish the time of transient occurrence in a block with more accuracy, and to use different threshold ratios for the comparisons to compensate for longer or shorter segments (and longer or shorter time for changes to occur).

33. With respect to **claim 21**, Smyth in view of Hilpert teaches everything claimed, as applied above (see claim 20); but while Smyth teaches a comparator to compare the energy difference of two subsamples, Smyth does not teach `the transient detector of claim 20 wherein the partition device divides the reference`

sample data into several subsample data according to the comparing result of the comparator, each subsample data including subband samples different from the subband samples of the preceding subsample data. However, the examiner contends that this concept was well known in the art, as shown by Davidson.

In the same field of endeavor, Davidson teaches an audio coder in which adjacent subblocks are compared, and comparison is repeated for the subframes on the next hierarchical level if a threshold is not surpassed *(Fig. 10, and 13-15; col. 23-25)*.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the coding apparatus of Smyth in view of Hilpert and the applicant's admitted prior art with Davidson's iterative comparison technique in order to establish the time of transient occurrence in a block with more accuracy.

Conclusion

34. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Akagiri (US 5,502,789) teaches a method and apparatus for audio encoding using subsidiary band coding, transient detection in a frequency band, and subdividing samples for more precise transient detection.

Davis et al. (US 5,451,954) teaches a method and apparatus for audio encoding using transient detection, comparison of energy between subdivided subblocks, and the use of alternate transforms for the transform coder.

Pan et al. (US 2007/0067166) teaches a method and device of multi-resolution vector quantization for audio coding that divides the vector in the time direction and the frequency direction.

Duxbury et al. ("A hybrid approach to musical note onset detection") teaches a method of onset detection based on subband decomposition and an energy-based detector.

Klapuri ("Sound onset detection by applying psychoacoustic knowledge") teaches an onset detector with a filter bank that divides the signal into nonoverlapping bands. In each band, onset times and intensities are detected and finally combined.

Bello et al. ("A tutorial on onset detection in music") teaches the state of the art and various methods of detection for transients, onsets, and attacks in audio signals.

35. Any inquiry concerning this communication or earlier communications from the examiner should be directed to GINA W. LEE whose telephone number is (571)270-3139. The examiner can normally be reached on Monday to Friday, 8:00 AM - 5:00 PM EST.

36. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Edouard can be reached on (571) 272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

37. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

GWL

/Talivaldis Ivars Smits/
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